

**Table 2-H-18a**  
**Bakersfield to Los Angeles – High-Speed Train Alignment Evaluation Matrix**  
**Bakersfield to Sylmar Segment**

**Alignment** = Alignment Carried Forward

**Alignment** = Alignment Eliminated

**Primary or Secondary Reason for Elimination**

| Evaluation Criteria                      | I-5 Corridor   |  | Antelope Valley Corridor                                   |  |
|--|--|--|--|--|
|  | I-5  | I-5 via Comanche Point                               | SR-58/Soledad Canyon                                       | SR-58/SR-14  |
|  | 2.5% grade   |  | 2.5% grade   |  |
|  | 3.5% grade   |  | 3.5% grade   |  |
| Maximize Ridership/Revenue Potential.    |  |  |  |  |
| Travel Time                              | 2.5%: 26.6 min.<br>3.5%: 27.4 min.                   | 27.2 min.  | 2.5%: 37.7 min.<br>3.5%: 37.8 min.                         | 37.8 min.  |
|  | 2.5%: 5    3.5%: 5                                   | 5  | 2.5%: 1    3.5%: 1   | 1  |
| Length                                   | 86.6 miles<br>(139.3 km)                             | 88.9 miles<br>(143.0 km)                             | 123.4 miles<br>(198.5 km)                                  | 123.7 miles<br>(199.0 km)                                  |
|  | 2.5%: 5    3.5%: 5                                   | 5  | 2.5%: 2    3.5%: 2   | 2  |
| Population/Employment Catchment          | • No Antelope Valley Population/employment catchment | • No Antelope Valley population/employment catchment | • Provides Antelope Valley population/employment catchment | • Provides Antelope Valley population/employment catchment |
|  | 2.5%: 1    3.5%: 1                                   | 1  | 2.5%: 5    3.5%: 5   | 5  |
| Maximize Connectivity and Accessibility. |  |  |  |  |
| Intermodal Connections                   | Not Applicable                                       | Not Applicable                                       | Not Applicable   | Not Applicable   |
|  |  |  |  |  |
| Minimize Operating and Capital Costs.    |  |  |  |  |
| Length                                   | 86.6 miles<br>(139.3 km)                             | 88.9 miles<br>(143.0 km)                             | 123.4 miles<br>(198.5 km)                                  | 123.7 miles<br>(199.0 km)                                  |
|  | 2.5%: 5    3.5%: 5                                   | 5  | 2.5%: 2    3.5%: 2   | 2  |

| Evaluation Criteria | I-5 Corridor  |   | Antelope Valley Corridor  |  |
|---------------------|---|---|---|--|
|                     | I-5   | I-5 via Comanche Point  | SR-58/Soledad Canyon  | SR-58/SR-14  |
|                     | 2.5% grade<br>3.5% grade  |   | 2.5% grade<br>3.5% grade  |  |
| Operational Issues  | <p><u>2.5%</u></p> <ul style="list-style-type: none"> <li>Achieves 220 mph (350 kph) operating speed throughout.</li> <li>4 tunnels - 44.8 mi. (72.1 km) total tunneling.</li> <li>Includes single tunnel 36.3 mi. (58.5 km.) long requiring adjacent escape tunnel.</li> <li>Sustained grades: 5 mi. (8km), 3.8 mi. (6km), 18.1 mi. (29km) &gt;1.5% 5 mi. (8 km) &gt; 2%</li> </ul> <p><u>3.5%</u></p> <ul style="list-style-type: none"> <li>Operating speeds reduced for 10 mi. (17 km) to average 165 mph (275 kph).</li> <li>13 tunnels – 34 mi. (54.8 km) total tunneling.</li> <li>Longest tunnel length is 11.6 mi. (18.6 km) – 2 tunnels of this length require escape tunnels, while others would not.</li> <li>Sustained grades of 4.4 mi. (7km) and 13.1 mi. (21km) at &gt;3% and 3.8 mi. (6km) at &gt;2% will require more power than flatter gradient alternative.</li> <li>Potential to avoid tunnel at San Andreas fault – although still fault zone issues.</li> </ul> | <ul style="list-style-type: none"> <li>Achieves 220 mph (350 kph) operating speed throughout.</li> <li>4 tunnels - 42.7 mi. (68.7 km) total tunneling.</li> <li>Includes single tunnel 34.3 mi. (68.7 km) long, requiring adjacent escape tunnel.</li> <li>Sustained grades: 5 mi. (8 km) &amp; 18.8 (30 km) &gt; 2%</li> </ul> | <p><u>2.5%</u></p> <ul style="list-style-type: none"> <li>Achieves 220 mph (350 kph) operating speed throughout.</li> <li>6 tunnels - 41.2 mi. (66.3 km) total tunneling.</li> <li>Sustained grades: 10.6 mi. (17km) &gt;1.5% 8.8 mi. (14 km), 11.3 mi. (18 km), 4.4 mi. (7km) &gt; 2%</li> <li>Two tunnels longer than 6 mi. (9.7 km) require adjacent escape tunnel.</li> <li>Many minimum-radius curves</li> </ul> <p><u>3.5%</u></p> <ul style="list-style-type: none"> <li>Operating speeds marginally reduced for 6 mi. (10 km) to 195 mph (325 kph).</li> <li>7 tunnels – 20.7 mi. (33.4 km) total tunneling.</li> <li>Sustained grades of 5 mi. (8km) and 6.3 mi. (10 km) at &gt;3% and 4.4 mi. (7km) at &gt;2% require more power than flatter gradient alternative.</li> <li>Longest tunnel is only 3.6 mi. (5.8 km) long</li> <li>Many minimum-radius curves</li> <li>Crosses Garlock Fault at grade rather than in tunnel.</li> </ul> | <ul style="list-style-type: none"> <li>Achieves 220 mph (350 kph) operating speed throughout.</li> <li>9 tunnels – 42.0 mi. (67.6 km) total tunneling.</li> <li>Longest tunnel is 11.7 mi. (18.8 km) long.</li> <li>Three tunnels longer than 6 mi. (9.7 km) require adjacent escape tunnel.</li> <li>Sustained grades: 11.3 mi. (18km), 12.5 mi. (20 km), 20.6 mi. (33 km) &gt; 2%</li> <li>Many minimum-radius curves</li> </ul> |
|                     | 2.5%: 3 3.5%: 3   | 3   | 2.5%: 2 3.5%: 3   | 2  |

| Evaluation Criteria | I-5 Corridor  |   | Antelope Valley Corridor  |  |
|---------------------|---|---|---|--|
|                     | I-5   | I-5 via Comanche Point  | SR-58/Soledad Canyon  | SR-58/SR-14  |
|                     | 2.5% grade<br>3.5% grade  |   | 2.5% grade<br>3.5% grade  |  |
| Construction Issues | <u>2.5%</u> <ul style="list-style-type: none"> <li>Construction risk of long tunnel.</li> <li>Limited access – some areas adjacent to I-5.</li> <li>Readily excavatable soils.</li> <li>Construction of a single tunnel over 30-miles long is not practicable because of California's geology and seismic conditions.</li> <li>Does not allow alignment to cross San Andreas and Garlock faults at-grade.</li> </ul><br><u>3.5%</u> <ul style="list-style-type: none"> <li>Shorter tunnels than 2.5% alternative reduces construction risk as compared to flatter grade.</li> <li>Limited access for portal construction.</li> <li>Readily excavatable soils.</li> <li>Longest single tunnel is about 6-miles in length.</li> </ul> | <ul style="list-style-type: none"> <li>Construction risk of long tunnel.</li> <li>Limited access.</li> <li>Readily excavatable soils.</li> <li>Construction of tunnels over 12-miles long is not practicable because of California's geology and seismic conditions.</li> <li>Does not allow alignment to cross San Andreas and Garlock faults at-grade.</li> </ul> | <u>2.5%</u> <ul style="list-style-type: none"> <li>Construction risk of tunnels.</li> <li>Highway access.</li> <li>Generally excavatable soils with deeper cuts in some areas requiring heavy ripping or blasting.</li> <li>Does not allow alignment to cross Garlock fault at-grade.</li> </ul><br><u>3.5%</u> <ul style="list-style-type: none"> <li>Much shorter tunnels than 2.5% grade alternative reduces construction risk as compared to flatter grade.</li> <li>Highway access generally available to portal sites.</li> <li>Generally excavatable soils with deeper cuts in some areas requiring heavy ripping or blasting.</li> <li>Minimizes tunneling</li> </ul> | <ul style="list-style-type: none"> <li>Construction risk of multiple tunnels.</li> <li>Highway access.</li> <li>Generally excavatable soils with deeper cuts in some areas requiring heavy ripping or blasting.</li> </ul> |
|                     | 2.5%: 1 3.5%: 3   | 1   | 2.5%: 1 3.5%: 4   | 2  |
|                     | <u>2.5%</u><br>\$8.1 Billion VHS<br>\$8.8 Billion Maglev<br><br><u>3.5%</u><br>\$7.0 Billion VHS<br>\$7.8 Billion Maglev  | \$7.8 Billion VHS<br>\$8.6 Billion Maglev   | <u>2.5%</u><br>\$6.9 Billion VHS<br>\$8.1 Billion Maglev<br><br><u>3.5%</u><br>\$5.7 Billion VHS<br>\$7.0 Billion Maglev  | \$7.0 Billion VHS<br>\$8.1 Billion Maglev  |
| Capital Cost        | 2.5%: 1 3.5%: 3   | 1   | 2.5%: 2 3.5%: 5   | 3  |

| Evaluation Criteria      | I-5 Corridor  |   | Antelope Valley Corridor  |   |
|--------------------------|---|---|---|---|
|                          | I-5   | I-5 via Comanche Point  | SR-58/Soledad Canyon  | SR-58/SR-14   |
|                          | 2.5% grade  |   | 2.5% grade  |   |
|                          | 3.5% grade  |   | 3.5% grade  |   |
| Right-of-Way Issues/Cost | <u>2.5%</u> <ul style="list-style-type: none"> <li>BNSF Arvin Branch ROW.</li> <li>New access roads required.</li> <li>Potential impacts on new developments in Santa Clarita.</li> <li>Tunneling minimizes impacts on forest lands</li> <li>Alignment crosses Santa Clara river flood plain at Santa Clarita.</li> </ul> | <ul style="list-style-type: none"> <li>BNSF Arvin Branch ROW.</li> <li>Power line easement from Comanche Point.</li> <li>New access road required.</li> <li>Potential impacts on new developments in Santa Clarita.</li> <li>Tunneling minimizes impacts on forest lands.</li> <li>Alignment crosses Santa Clara river flood plain at Santa Clarita.</li> </ul> | <u>2.5%</u> <ul style="list-style-type: none"> <li>Relocation of UPRR/Metrolink from Palmdale to Mojave.</li> <li>Small segment in Angeles National Forest in Soledad Canyon, alignment in tunnel.</li> </ul> | <ul style="list-style-type: none"> <li>Relocation of UPRR/Metrolink from Palmdale to Mojave.</li> </ul> |
|                          | <ul style="list-style-type: none"> <li>BNSF Arvin Branch ROW.</li> <li>New access roads required to tunnels (28 portals).</li> <li>Potential impacts on new developments in Santa Clarita.</li> <li>Alignment crosses Santa Clara river flood plain at Santa Clarita.</li> </ul>  |   | <u>3.5%</u> <ul style="list-style-type: none"> <li>Relocation of UPRR/Metrolink from Palmdale to Mojave.</li> <li>Small segment in Angeles National Forest in Soledad Canyon, alignment at-grade.</li> </ul>  |   |
|                          | 2.5%: <b>3</b> 3.5%: <b>2</b>   |   | 2.5%: <b>3</b> 3.5%: <b>2</b>   |   |

| Evaluation Criteria   | I-5 Corridor  |  | Antelope Valley Corridor  |  |
|---|---|--|---|--|
|   | I-5   | I-5 via Comanche Point   | SR-58/Soledad Canyon  | SR-58/SR-14  |
|   | 2.5% grade  |  | 2.5% grade  |  |
|   | 3.5% grade  |  | 3.5% grade  |  |
| Maximize Compatibility with Existing and Planned Development. |   |  |   |  |
| Land Use Compatibility and Conflicts                          | <u>2.5%</u> <ul style="list-style-type: none"><li>Residential land uses approaching Bakersfield.</li><li>Farm impacts in Central Valley.</li><li>Major portion of alignment is in tunnel.</li><li>Impacts mixed commercial/industrial areas in the Santa Clarita area.</li><li>Crosses the Santa Clarita River.</li></ul>   | <ul style="list-style-type: none"><li>Residential land uses approaching Bakersfield.</li><li>Farm impacts in Central Valley.</li><li>Oil field at toe of slope in Central Valley.</li><li>Major portion of alignment is in tunnel.</li><li>Impacts mixed commercial/industrial uses in the Santa Clarita area.</li></ul> | <u>2.5%</u> <ul style="list-style-type: none"><li>Approaches Bakersfield in rail/highway corridor.</li><li>Grazing land impacts in Tehachapis.</li><li>May indirectly impact mixed commercial/industrial/ residential land uses in Palmdale and Lancaster.</li><li>Major portion of alignment in the Santa Clarita and Soledad Canyon areas in tunnel.</li><li>Adjacent to existing concrete plant in the Santa Clara River near Soledad Canyon.</li></ul>  | <ul style="list-style-type: none"><li>Approaches Bakersfield in rail/highway corridor.</li><li>Grazing land impacts in Tehachapis.</li><li>May indirectly impact mixed commercial/industrial/ residential land uses in Palmdale/Lancaster/ Rosamond.</li><li>A portion of the alignment parallels/crosses SR-14 and affects adjacent rural estate uses in the Acton area.</li><li>Conflicts with proposed commercial land use in the Santa Clarita/LA County area.</li></ul> |
|   | <u>3.5%</u> <ul style="list-style-type: none"><li>Residential land uses approaching Bakersfield.</li><li>Farm impacts in Central Valley.</li><li>Portion of alignment is in tunnel.</li><li>Requires access roads to tunnel portals in sensitive habitat areas.</li><li>Impacts mixed commercial/industrial areas in the Santa Clarita area.</li><li>Crosses the Santa Clarita River.</li><li>Crosses at-grade through developed area adjacent to Castaic Lagoon.</li><li>Crosses at-grade through developing area adjacent to Pico Canyon Road in Santa Clarita.</li></ul> |  | <u>3.5%</u> <ul style="list-style-type: none"><li>Approaches Bakersfield in rail/highway corridor.</li><li>Grazing land impacts in Tehachapis.</li><li>May indirectly Impact mixed commercial/industrial/ residential land uses in Palmdale and Lancaster.</li><li>Crosses rural estate area in Soledad Canyon at grade.</li><li>Traverses National Forest land in Soledad Canyon at grade.</li><li>Visible from rural campgrounds in Soledad Canyon.</li><li>Adjacent to existing concrete plant in the Santa Clara River near Soledad Canyon.</li></ul> |  |
|   | 2.5%: 4 3.5%:   | 4  | 2.5%: 4 3.5%: 2   | 4  |

| Evaluation Criteria    | I-5 Corridor   |   | Antelope Valley Corridor   |  |
|------------------------|--|---|--|--|
|                        | I-5  | I-5 via Comanche Point  | SR-58/Soledad Canyon   | SR-58/SR-14  |
|                        | 2.5% grade<br>3.5% grade   |   | 2.5% grade<br>3.5% grade   |  |
| Visual Quality Impacts | <p><u>2.5%</u></p> <ul style="list-style-type: none"> <li>Aerial structure at Bakersfield station and through urban area to east.</li> <li>At grade through farmlands south of Bakersfield.</li> <li>Visible from residential areas south of Bakersfield.</li> <li>At grade for 1.5 mi. across vacant, rugged land, including Towsley Canyon which is being considered for SEA status. Will be visible to residences 0.75 away across I-5 at a lower elevation in Santa Clarita. There will be extensive visible earthwork.</li> <li>Cut and fill thru center of Santa Clarita Sports Park site (unbuilt).</li> <li>Balance tunnel, no impact.</li> </ul> <p><u>3.5%</u></p> <ul style="list-style-type: none"> <li>Aerial structure at Bakersfield station and through urban area to east.</li> <li>Visible from residential areas south of Bakersfield.</li> <li>At grade through farmlands south of Bakersfield.</li> <li>At grade in rural area just south of San Andreas Fault.</li> <li>At grade for 1.5 mi. across vacant, rugged land, including Towsley Canyon which is being considered for SEA status.</li> <li>Will be visible to residences 0.75 away across I-5 at a lower elevation in Santa Clarita. There will be extensive visible earthwork.</li> </ul> | <ul style="list-style-type: none"> <li>Aerial structure at Bakersfield station and through urban area to east.</li> <li>Visible from residential areas south of Bakersfield.</li> <li>At grade through farmlands south of Bakersfield.</li> <li>At grade for 1.5 mi. across vacant, rugged land, including Towsley Canyon which is being considered for SEA status. Will be visible to residences 0.75 away across I-5 at a lower elevation in Santa Clarita. There will be extensive visible earthwork.</li> <li>Cut and fill through center of Santa Clarita Sports Park site (unbuilt).</li> <li>Balance tunnel, no impact.</li> </ul> | <p><u>2.5%</u></p> <ul style="list-style-type: none"> <li>Aerial structure at Bakersfield station and through urban area to east.</li> <li>Agriculture/vacant land along SR-158 south of tunnel under Tehachapis.</li> <li>At grade and part of bridge near 5 widely scattered residences.</li> <li>At grade w/in 200 ft. of residences for 2 mi. on west: w/in 400 ft. of residences for 0.25 mi. on east; w/in 0.25 mi. of residences for 0.75 on east.</li> <li>At grade, Rosamond Park 1,000 ft. to west (first tier).</li> <li>At grade, a few scattered residences (close as 100 ft.) south of Rosamond.</li> <li>Lancaster, bridge for 5 mi. Mostly commercial area (w/in 100 ft.). May be some first tier residences on east.</li> <li>Palmdale, at grade through mostly commercial area (w/in 100 ft.) for length of 1.5 mi. May be a few first tier residences.</li> <li>Palmdale, bridge w/in 500 ft. of residential development for length of 1,000 ft.</li> <li>Tunnel through Soledad Canyon. No impacts.</li> </ul> <p><u>3.5%</u></p> <ul style="list-style-type: none"> <li>Aerial structure at Bakersfield station and through urban area to east.</li> <li>At-grade at some locations along SR-58.</li> <li>At grade near UP Tehachapi Loop.</li> </ul> | <ul style="list-style-type: none"> <li>Aerial structure at Bakersfield station and through urban area to east.</li> <li>Agriculture/vacant land along SR-158 south of tunnel under Tehachapis.</li> <li>At grade and part of bridge near 5 widely scattered residences.</li> <li>At grade w/in 200 ft. of residences for 2 mi. on west: w/in 400 ft. of residences for 0.25 mi. on east; w/in 0.25 mi. of residences for 0.75 on east.</li> <li>At grade, Rosamond Park 1,000 ft. to west (first tier).</li> <li>At grade, a few scattered residences (close as 100 ft.) south of Rosamond.</li> <li>Lancaster, bridge for 5 mi. Mostly commercial area (w/in 100 ft.). May be some first tier residences on east.</li> <li>Palmdale, at grade through mostly commercial area (w/in 100 ft.) for length of 1.5 mi. May be a few first tier residences.</li> <li>Palmdale, bridge w/in 500 ft. of residential development for length of 1,000 ft.</li> <li>Bridge at Vasquez Park extends for 0.75 mi. along south edge of park. Negative for park users, positive for passengers.</li> <li>Bridge east of Crown Valley Rd. w/in 1,000 ft. of Vasquez High School (first tier) and slightly further from a junior. high school.</li> <li>Bridge at Santiago Road, may be some residences w/in 200 to 300 ft.</li> </ul> |

| Evaluation Criteria | I-5 Corridor  |                        | Antelope Valley Corridor  |             |
|---------------------|---|------------------------|---|-------------|
|                     | I-5   | I-5 via Comanche Point | SR-58/Soledad Canyon  | SR-58/SR-14 |
|                     | 2.5% grade<br>3.5% grade  |                        | 2.5% grade<br>3.5% grade  |             |
|                     | <ul style="list-style-type: none"> <li>• Cut and fill through center of Santa Clarita Sports Park site (unbuilt).</li> <li>• At-grade through developed area adjacent to Castaic Lagoon.</li> <li>• At-grade through developing area in Santa Clarita.</li> <li>• Requires access roads to tunnel portals in sensitive habitat areas. Extensive visible earthwork.</li> <li>• Balance tunnel, no impact.</li> </ul> |                        | <ul style="list-style-type: none"> <li>• At grade near community of Tehachapi.</li> <li>• Agriculture/vacant land along SR-158 south of tunnel under Tehachapis.</li> <li>• At grade and part of bridge near 5 widely scattered residences.</li> <li>• At grade w/in 200 ft. of residences for 2 mi. on west: w/in 400 ft. of residences for 0.25 mi. on east; w/in 0.25 mi. of residences for 0.75 on east.</li> <li>• At grade, Rosamond Park 1,000 ft. to west (first tier).</li> <li>• At grade, a few scattered residences (close as 100 ft.) south of Rosamond.</li> <li>• Lancaster, bridge for 5 mi. Mostly commercial area (w/in 100 ft.). May be some first tier residences on east.</li> <li>• Palmdale, at grade through mostly commercial area (w/in 100 ft.) for 1.5 mi. May be a few first tier residences.</li> <li>• Palmdale, bridge w/in 500 ft. of residential development for length of 1,000 ft.</li> <li>• At grade through rural estate area in Soledad Canyon.</li> <li>• At grade crossing National Forest land in Soledad Cn.</li> <li>• At grade near rural campgrounds in Soledad Cn.</li> </ul> |             |
|                     | 2.5%: <b>2</b> 3.5%: <b>1</b>   | <b>2</b>               | 2.5%: <b>2</b> 3.5%: <b>1</b>   | <b>2</b>    |

| Evaluation Criteria  | I-5 Corridor   |   | Antelope Valley Corridor   |  |
|--|--|---|--|--|
|  | I-5  | I-5 via Comanche Point  | SR-58/Soledad Canyon   | SR-58/SR-14  |
|  | 2.5% grade   |   | 2.5% grade   |  |
|  | 3.5% grade   |   | 3.5% grade   |  |
| Minimize Impacts on Natural Resources.   |  |   |  |  |
| <b>Water Resources</b><br>Number and sensitivity level of waters and potential wetland/riparian resources crossed by alignment.<br>Sensitivity of surface waters proximate (< 1 mile) to tunnel segments<br>(total number crossed/linear ft) | <u>2.5%</u> <ul style="list-style-type: none"><li>At-grade crossings: 2 low, 2 low/mod, 1 mod/high.</li><li>Tunnel overcrossings: 24 low, 10 low/mod, 6 mod/high.</li><li>Proximate to tunneled segments: 35 low, 7 low/mod, 1 high.</li></ul>                       | <ul style="list-style-type: none"><li>At-grade crossings: 1 low, 2 low/mod,1 mod/high. (4/200)</li><li>Tunnel overcrossings: 31 low, 12 low/mod, 5 mod/high. (48/2,400)</li><li>Proximate to tunneled segments: 37 low, 5 low/mod, 1 high. (43/2,150)</li></ul> | <u>2.5%</u> <ul style="list-style-type: none"><li>At-grade crossings: 26 low, 12 low/mod, 2 mod/high.</li><li>Tunnel overcrossings: 41 low, 12 low/mod, 4 mod/high.</li><li>Proximate to tunneled segments: 5 low, 5 low/mod, 1 mod/high, 1 high.</li></ul>  | <ul style="list-style-type: none"><li>At-grade crossings: 27 low, 14 low/mod, 1 mod/high(+ 1 mod/high bridged). (42/2,600)</li><li>Tunnel overcrossings: 32 low, 4 low/mod, 1 mod/high. (37/1,850)</li><li>Proximate to tunneled segments: 7 low, 5 low/mod. (12/600)</li></ul>        |
|  | <u>3.5%</u> <ul style="list-style-type: none"><li>At-grade crossings: 4 low, 7 low/mod, 6 mod/high. (17/850)</li><li>Tunnel overcrossings: 23 low, 5 low/mod, 1 mod/high. (29/1,450)</li><li>Proximate to tunneled segments: 31 low, 4 mod/low. (35/1,750)</li></ul> |   | <u>3.5%</u> <ul style="list-style-type: none"><li>At-grade crossings: 39 low, 19 low/mod, 4 mod/high. (62/3,100)</li><li>Tunnel overcrossings: 29 low, 13 low/mod, 2 mod/high. (44/2,200)</li><li>Proximate to tunneled segments: 4 low, 4 low/mod, 1 mod/high, 1 high. (10/500)</li></ul>                             |  |
|  | 2.5%: 2    3.5%: 1   |   | 2  |  |
| <b>Floodplain Impacts</b>  | <u>2.5%</u> <ul style="list-style-type: none"><li>Crosses major floodplain areas south of Bakersfield.</li><li>Crosses Santa Clara River Floodplain.</li></ul>   | <ul style="list-style-type: none"><li>Crosses major floodplain areas south of Bakersfield.</li><li>Crosses Santa Clara River floodplain.</li></ul>  | <u>2.5%</u> <ul style="list-style-type: none"><li>Major 100-year floodplain at toe of Tehachapis in Central Valley.</li><li>Extensive 100-year floodpains just north of Lancaster.</li><li>500-year floodplains in Palmdale and Lancaster.</li><li>Crosses Santa Clara River floodplain.</li></ul>                     | <ul style="list-style-type: none"><li>Major 100-year floodplain at toe of Tehachapis in Central Valley.</li><li>Extensive 100-year floodpains just north of Lancaster.</li><li>500-year floodplains in Palmdale and Lancaster.</li><li>Crosses Santa Clara River floodplain.</li></ul> |
|  | <u>3.5%</u> <ul style="list-style-type: none"><li>Crosses major floodplain areas south of Bakersfield.</li><li>Crosses floodplains in Tehachapi Mountains.</li><li>Crosses tributaries to Pyramid Lake.</li><li>Crosses Santa Clara River Floodplain.</li></ul>      |   | <u>3.5%</u> <ul style="list-style-type: none"><li>Major 100-year floodplain at toe of Tehachapis in Central Valley.</li><li>Extensive 100-year floodpains just north of Lancaster.</li><li>500-year floodplains in Palmdale and Lancaster.</li><li>Crosses Santa Clara River floodplain in Santa Clarita and</li></ul> |  |
|  |  |   |  |  |



| Evaluation Criteria                                       | I-5 Corridor   |  | Antelope Valley Corridor  |   |
|---|--|--|---|---|
|   | I-5  | I-5 via Comanche Point   | SR-58/Soledad Canyon  | SR-58/SR-14   |
|   | 2.5% grade<br>3.5% grade   |  | 2.5% grade<br>3.5% grade  |   |
| Wetlands (sites/area)                                     | 16/8.2 ac  | 10/5.6 ac  | Soledad Canyon.<br>3/0.7 ac   | 3/0.7 ac  |
|   | 2.5%: <b>4</b> 3.5%: <b>3</b>  | <b>4</b>   | 2.5%: <b>3</b> 3.5%: <b>2</b>   | <b>3</b>  |
| <b>Threatened &amp; Endangered Species Impacts</b>        | <u>2.5%</u> <ul style="list-style-type: none"> <li>15 + sensitive species found within alignment, however, lower potential for impact due to length of tunneling.</li> </ul>   | <ul style="list-style-type: none"> <li>15 + sensitive species found within alignment, however, lower potential for impact due to length of tunneling.</li> </ul> | <u>2.5%</u> <ul style="list-style-type: none"> <li>Higher potential to impact 15 + sensitive species due to length of at-grade alignment in undeveloped areas.</li> </ul> | <ul style="list-style-type: none"> <li>Higher potential to impact 15 + sensitive species due to length of at-grade alignment in undeveloped areas.</li> </ul> |
|   | <u>3.5%</u> <ul style="list-style-type: none"> <li>More at-grade alignment in native habitat areas creates higher potential for impacts.</li> <li>Power lines to tunnel portals or along at-grade segments may impact California condors.</li> </ul> |  | <u>3.5%</u> <ul style="list-style-type: none"> <li>Even higher potential to impact sensitive species due to increased alignment at-grade.</li> </ul>                      |   |
|   | 2.5%: <b>5</b> 3.5%: <b>3</b>  | <b>5</b>   | 2.5%: <b>4</b> 3.5%: <b>3</b>   | <b>4</b>  |
| <i>Minimize Impacts on Social and Economic Resources.</i> |  |  |   |   |
| <b>Environmental Justice Impacts<br/>(Demographics)</b>   | Central Valley:<br>1990 Minority population: 22,595<br>1990 In-poverty households: 262   | Central Valley:<br>1990 Minority population: 22,595<br>1990 In-poverty households: 262   | Central Valley:<br>1990 Minority population: 13,744<br>1990 In-poverty households: 262  | Central Valley:<br>1990 Minority population: 13,744<br>1990 In-poverty households: 262  |
|   | Tehachapis, south:<br>1990 Minority population: 3,051<br>1990 In-poverty households: 76  | Tehachapis, south:<br>1990 Minority population: 3,049<br>1990 In-poverty households: 74  | Tehachapis, south:<br>1990 Minority population: 4,165<br>1990 In-poverty households: 1,031  | Tehachapis, south:<br>1990 Minority population: 4,158<br>1990 In-poverty households: 1,031  |
|   | Total:<br>1990 Minority population: 25,646<br>1990 In-poverty households: 338  | Total:<br>1990 Minority population: 25,644<br>1990 In-poverty households: 336  | Total:<br>1990 Minority population: 17,909<br>1990 In-poverty households: 1,293   | Total:<br>1990 Minority population: 17,902<br>1990 In-poverty households: 1,293   |
|   | 2.5%: <b>4</b> 3.5%: <b>4</b>  | <b>4</b>   | 2.5%: <b>4</b> 3.5%: <b>4</b>   | <b>4</b>  |

| Evaluation Criteria                            | I-5 Corridor  |   | Antelope Valley Corridor   |   |
|--|---|---|--|---|
|  | I-5   | I-5 via Comanche Point  | SR-58/Soledad Canyon   | SR-58/SR-14   |
|  | 2.5% grade<br>3.5% grade  |   | 2.5% grade<br>3.5% grade   |   |
| <b>Farmland Impacts</b>                        | <ul style="list-style-type: none"> <li>Alignment would impact existing farmlands south of Bakersfield before reaching the Tehachapi mountains.</li> <li>Crosses grazing areas.</li> <li>Alignment encroaches on a small amount of existing farmland near Santa Clara River/SR-126.</li> <li>Alignment traverses soils in the Santa Clara River and its tributary areas that could be farmed.</li> </ul>   | <ul style="list-style-type: none"> <li>Alignment would impact existing farmlands south of Bakersfield before reaching the Tehachapi mountains.</li> <li>Crosses grazing areas.</li> <li>Alignment encroaches on a small amount of existing farmland near Santa Clara River/SR-126.</li> <li>Alignment traverses soils in the Santa Clara River and its tributary areas that could be farmed.</li> </ul> | <ul style="list-style-type: none"> <li>The alignment would impact prime soils and existing farmlands outside of the city of Bakersfield.</li> <li>Crosses grazing areas.</li> <li>The alignment would cross soils suitable for farming in the Rosamond, Lancaster and Palmdale areas.</li> </ul>   | <ul style="list-style-type: none"> <li>The alignment would impact prime soils and existing farmland outside the city of Bakersfield.</li> <li>Crosses grazing areas.</li> <li>The alignment would cross soils suitable for farming in the Rosamond, Lancaster and Palmdale areas.</li> </ul>  |
|  | 2.5%: <b>3</b> 3.5%: <b>3</b>   | <b>3</b>  | 2.5%: <b>2</b> 3.5%: <b>2</b>  | <b>2</b>  |
| <i>Minimize Impacts on Cultural Resources.</i> |   |   |  |   |
| <b>Cultural Resources Impacts</b>              | <p><u>2.5%</u></p> <ul style="list-style-type: none"> <li>Few recorded resources on GIS.</li> <li>Overall probable impact is low; route is primarily tunnel over Tehachapis.</li> <li>Potential impacts at bridge crossings of Santa Clara River and Castaic Creek.</li> </ul> <p><u>3.5%</u></p> <ul style="list-style-type: none"> <li>Few recorded resources on GIS.</li> <li>Overall probable impact is increased as more of the alignment is at-grade over Tehachapis.</li> <li>Potential impacts at bridge crossings of Santa Clara River and Castaic Creek.</li> </ul> | <ul style="list-style-type: none"> <li>Few recorded resources on GIS.</li> <li>Overall probable impact is low; route is primarily tunnel over Tehachapis.</li> <li>Potential impacts at bridge crossings of Santa Clara River and Castaic Creek.</li> </ul>   | <p><u>2.5%</u></p> <ul style="list-style-type: none"> <li>Few recorded resources on GIS.</li> <li>Potential impacts during at-grade/bridge passage through Palmdale, Lancaster, Rosamond and near Edwards AFB, Mojave and Tehachapi, and crossings of Tehachapi Creek. Includes visual impacts on historical resources.</li> <li>Overall probable impact is moderate along SR-58; route crosses open desert, is partially tunnel northwest of Mojave.</li> <li>Overall probable impact is low in Soledad Canyon since route is mostly tunnel.</li> <li>Potential impacts at at-grade/bridge crossings of Santa Clara River and Mill Creek.</li> </ul> <p><u>3.5%</u></p> <ul style="list-style-type: none"> <li>Few recorded resources on GIS.</li> <li>At-grade adjacent to historic Tehachapi Loop on UPRR.</li> </ul> | <ul style="list-style-type: none"> <li>Few recorded resources on GIS</li> <li>Potential impacts during at-grade/bridge passage through Palmdale, Lancaster, Rosamond and near Edwards AFB, Mojave and Tehachapi, and crossings of Tehachapi Creek. Includes visual impacts on historical resources.</li> <li>Overall probable impact is moderate along SR-58; route crosses open desert, is partially tunnel northwest of Mojave.</li> <li>Overall probable impact is low along SR-14; route is mostly tunnel.</li> <li>Potential impacts at at-grade/bridge crossings of Santa Clara River, Aqua Dulce Canyon, Escondido Canyon and Acton Canyon.</li> <li>Four sites recorded at Vasquez Rocks County Park, possible visual impacts.</li> </ul> |

| Evaluation Criteria | I-5 Corridor       |                        | Antelope Valley Corridor   |             |
|---------------------|--------------------|------------------------|--|-------------|
|                     | I-5                | I-5 via Comanche Point | SR-58/Soledad Canyon   | SR-58/SR-14 |
|                     | 2.5% grade         |                        | 2.5% grade   |             |
|                     | 3.5% grade         |                        | 3.5% grade   |             |
|                     |                    |                        | <ul style="list-style-type: none"> <li>• Potential impacts during at-grade/bridge passage through Palmdale, Lancaster, Rosamond and near Edwards AFB, Mojave and Tehachapi, and crossings of Tehachapi Creek. Includes visual impacts on historical resources. Longer at-grade segment near Tehachapi.</li> <li>• Overall probable impact is moderate along SR-58; crosses open desert, partially tunnel northwest of Mojave.</li> <li>• Overall probable impact is moderate in Soledad Canyon since a portion of the route is at-grade.</li> <li>• Potential impacts at at-grade/bridge crossings of Santa Clara River and Mill Creek.</li> </ul> |             |
|                     | 2.5%: 5    3.5%: 4 | 5                      | 2.5%: 2    3.5%: 2   | 2           |

| Evaluation Criteria                                       | I-5 Corridor  |   | Antelope Valley Corridor  |  |
|---|---|---|---|--|
|   | I-5   | I-5 via Comanche Point  | SR-58/Soledad Canyon  | SR-58/SR-14  |
|   | 2.5% grade<br>3.5% grade  |   | 2.5% grade<br>3.5% grade  |  |
| <b>Parks &amp; Recreation/Wildlife<br/>Refuge Impacts</b> | <p><u>2.5%</u></p> <ul style="list-style-type: none"> <li>Low potential for visual impacts.</li> <li>Passes on bridge near Santa Clarita Sports Park, and bridge or tunnel at Castaic Lake State Recreation Area, tunnel under Angeles and Los Padres National Forests.</li> <li>Crosses at grade through Towsley Canyon, which is being considered for SEA status.</li> </ul> <p><u>3.5%</u></p> <ul style="list-style-type: none"> <li>Some potential for visual impacts.</li> <li>Passes on bridge near Santa Clarita Sports Park, and bridge or tunnel at Castaic Lake State Recreation Area, tunnel under Angeles and Los Padres National Forests.</li> <li>Crosses at grade through Towsley Canyon, which is being considered for SEA status.</li> <li>At grade adjacent to off-road vehicle park.</li> <li>At grade near Condor refuge.</li> </ul> | <ul style="list-style-type: none"> <li>Low potential for visual impacts.</li> <li>Passes on bridge near Santa Clarita Sports Park, and bridge or tunnel at Castaic Lake State Recreation Area, tunnel under Angeles and Los Padres National Forests.</li> <li>Crosses at grade through Towsley Canyon, which is being considered for SEA status.</li> </ul> | <p><u>2.5%</u></p> <ul style="list-style-type: none"> <li>Crosses small area of National Forest in tunnel in Soledad Canyon.</li> <li>No local or County public park resources located in Soledad Canyon.</li> <li>Passes Sierra Highway Greenbelt in Palmdale.</li> </ul> <p><u>3.5%</u></p> <ul style="list-style-type: none"> <li>At-grade segment visible from rural town of Tehachapi.</li> <li>Crosses small area of National Forest at-grade in Soledad Canyon.</li> <li>Visible from rural campgrounds in Soledad Canyon.</li> <li>No local or County public park resources located in Soledad Canyon.</li> <li>Passes Sierra Highway Greenbelt in Palmdale.</li> </ul> | <ul style="list-style-type: none"> <li>Low potential for visual impacts along SR-14.</li> <li>Passes on bridge/at-grade near Vasquez Rocks County Park; potential for visual impacts.</li> <li>Passes Sierra Highway Greenbelt in Palmdale.</li> </ul> |
|   | 2.5%: <b>3</b> 3.5%: <b>2</b>   | <b>3</b>  | 2.5%: <b>4</b> 3.5%: <b>3</b>   | <b>3</b>   |

| Evaluation Criteria  | I-5 Corridor   |  | Antelope Valley Corridor  |   |
|--|--|--|---|---|
|  | I-5  | I-5 via Comanche Point   | SR-58/Soledad Canyon  | SR-58/SR-14   |
|  | 2.5% grade<br>3.5% grade   |  | 2.5% grade<br>3.5% grade  |   |
| Maximize Avoidance of Areas with Geologic and Soils Constraints. |  |  |   |   |
| Soils/Slope Constraints  | <ul style="list-style-type: none"><li>Medium – Intermediate hardness units considered unlikely to marginal relative to compressibility.</li><li>Low - Probably stable formations consisting of hard rock or granular continental deposits.</li></ul> | <ul style="list-style-type: none"><li>Medium – Intermediate hardness units considered unlikely to marginal relative to compressibility.</li><li>Low – Probably stable formations consisting of hard rock or granular continental deposits.</li></ul>       | <ul style="list-style-type: none"><li>High – Low subsidence potential, high compressibility.</li><li>Medium – Formations with marginal stability including largely continental deposits and older (Paleozoic) marine sediments.</li></ul> | <ul style="list-style-type: none"><li>High – Low subsidence potential, high compressibility.</li><li>Medium – Formations with marginal stability including largely continental deposits and older (Paleozoic) marine sediments.</li></ul>                 |
|  | 2.5%: 3    3.5%: 3   | 3  | 2.5%: 4    3.5%: 4  | 4   |
| Seismic Constraints  | <ul style="list-style-type: none"><li>Low/Medium–Probable ground motion from earthquakes.</li><li>Medium–Active fault crossings.</li><li>Medium/High–Liquefaction potential.</li></ul>   | <ul style="list-style-type: none"><li>Low/Medium–Probable ground motion from earthquakes.</li><li>Medium–Active fault crossings.</li><li>Medium/High–Liquefaction potential.</li><li>Crosses both San Andreas and Garlock Faults in deep tunnel.</li></ul> | <ul style="list-style-type: none"><li>High – Probable ground motion from earthquakes.</li><li>High – Active fault crossings.</li><li>Low – Liquefaction potential.</li></ul>  | <ul style="list-style-type: none"><li>High – Probable ground motion from earthquakes.</li><li>High – Active fault crossings.</li><li>Low – Liquefaction potential.</li><li>Crosses Garlock Fault in tunnel; crosses San Andreas Fault at grade.</li></ul> |
|  | <u>2.5%</u> <ul style="list-style-type: none"><li>Crosses both San Andreas and Garlock Faults in deep tunnel.</li></ul><br><u>3.5%</u> <ul style="list-style-type: none"><li>Crosses Garlock Fault and San Andreas Fault at-grade.</li></ul>         |  | <u>2.5%</u> <ul style="list-style-type: none"><li>Crosses Garlock Fault in tunnel.</li></ul><br><u>3.5%</u> <ul style="list-style-type: none"><li>Crosses both Garlock Fault and San Andreas Fault at grade.</li></ul>                    |   |
|  | 2.5%: 1    3.5%: 3   | 1  | 2.5%: 1    3.5%: 4  | 2   |
| Maximize Avoidance of Areas with Potential Hazardous Materials.  |  |  |   |   |
| Hazardous Materials/Waste Constraints                            | <ul style="list-style-type: none"><li>There are approximately 3 CERCLIS, SPL, or SCL sites</li><li>There are oil fields adjacent to the I-5 near Highway 126.</li></ul>  | <ul style="list-style-type: none"><li>There are approximately 2 CERCLIS, SPL, or SCL sites</li><li>There are oil fields adjacent to the I-5 near Highway 126.</li></ul>  | <ul style="list-style-type: none"><li>There are approximately 20 CERCLIS, SPL, or SCL sites.</li><li>There are oil fields off of San Fernando Road.</li></ul>   | <ul style="list-style-type: none"><li>There are approximately 20 CERCLIS, SPL, or SCL sites.</li><li>There are oil fields off of San Fernando Road.</li></ul>   |
|  | 2.5%: 4    3.5%: 4   | 4  | 2.5%: 3    3.5%: 3  | 3   |

1   2   3   4   5  
Least Favorable                      Most Favorable

**Table 2-H-18a continued**  
**Bakersfield to Los Angeles – High-Speed Train Alignment Evaluation Matrix**  
**Bakersfield to Sylmar Segment continued**

**Alignment** = Alignment Carried Forward

**Alignment** = Alignment Eliminated

**Primary or Secondary Reason for Elimination**

| Evaluation Criteria                             | SR-138/Soledad Canyon   | SR-138/SR-14  | Aqueduct/Soledad Canyon   | Aqueduct/SR-14  |
|---|---|---|---|---|
| <i>Maximize Ridership/Revenue Potential.</i>    |   |   |   |   |
| <b>Travel Time</b>                              | 38.5 min.   | 38.6 min.   | 36.8 min.   | 36.9 min.   |
|   | 1   | 1   | 2   | 2   |
| <b>Length</b>                                   | 127.6 miles<br>(205.3 km)   | 128.0 miles<br>(205.9 km)   | 121.9 miles<br>(196.1 km)   | 122.2 miles<br>(196.7 km)   |
|   | 1   | 1   | 2   | 2   |
| <b>Population/Employment Catchment</b>          | <ul style="list-style-type: none"> <li>Provides Antelope Valley population/employment catchment.</li> </ul> | <ul style="list-style-type: none"> <li>Provides Antelope Valley population/employment catchment.</li> </ul> | <ul style="list-style-type: none"> <li>Provides Antelope Valley population/employment catchment.</li> </ul> | <ul style="list-style-type: none"> <li>Provides Antelope Valley population/employment catchment.</li> </ul> |
|   | 5   | 5   | 5   | 5   |
| <i>Maximize Connectivity and Accessibility.</i> |   |   |   |   |
| <b>Intermodal Connections</b>                   | Not Applicable  | Not Applicable  | Not Applicable  | Not Applicable  |
|   |   |   |   |   |
| <i>Minimize Operating and Capital Costs.</i>    |   |   |   |   |
| <b>Length</b>                                   | 127.6 miles<br>(205.3 km)   | 128.0 miles<br>(205.9 km)   | 121.9 miles<br>(196.1 km)   | 122.2 miles<br>(196.7 km)   |
|   | 1   | 1   | 2   | 2   |

| Evaluation Criteria             | SR-138/Soledad Canyon  | SR-138/SR-14   | Aqueduct/Soledad Canyon  | Aqueduct/SR-14   |
|---------------------------------|--|--|--|--|
| <b>Operational Issues</b>       | <ul style="list-style-type: none"> <li>Achieves 220 mph (350 kph) operating speed throughout.</li> <li>4 tunnels – 31.5 mi. (50.6 km) total tunnel length.</li> <li>Longest tunnel is 14.2 mi. (22.8 km) long.</li> <li>Two tunnels longer than 6 mi. (9.7 km) require adjacent escape tunnel.</li> <li>Sustained grades: 18.8 mi. (30 km) &gt; 2%</li> <li>Many minimum-radius curves.</li> </ul> | <ul style="list-style-type: none"> <li>Achieves 220 mph (350 kph) operating speed throughout.</li> <li>7 tunnels – 32.3 mi. (52.0 km) total tunnel length.</li> <li>Longest tunnel is 14.2 mi. (22.8 km) long.</li> <li>Two tunnels longer than 6 mi. (9.7 km) require adjacent escape tunnel.</li> <li>Sustained grades: 11.3 mi. (18km) &amp; 18.8 mi. (30 km) &gt; 2%</li> <li>Many minimum-radius curves.</li> </ul> | <ul style="list-style-type: none"> <li>Achieves 220 mph (350 kph) operating speed throughout.</li> <li>4 tunnels – 31.5 mi. (50.7 km) total tunnel length.</li> <li>Longest tunnel is 14.2 mi. (22.8 km) long.</li> <li>Two tunnels longer than 6 mi. (9.7 km) require adjacent escape tunnel.</li> <li>Sustained grades: 18.8 mi. (30 km) &gt; 2%</li> <li>Many minimum-radius curves.</li> </ul> | <ul style="list-style-type: none"> <li>Achieves 220 mph (350 kph) operating speed throughout.</li> <li>7 tunnels – 32.3 mi. (52.0 km) total tunnel length.</li> <li>Longest tunnel is 14.2 mi. (22.8 km) long.</li> <li>Two tunnels longer than 6 mi. (9.7 km) require adjacent escape tunnel.</li> <li>Sustained grades: 11.3 mi. (18km) &amp; 18.8 mi. (30 km) &gt; 2%</li> <li>Many minimum-radius curves.</li> </ul> |
|                                 | 3  | 3  | 3  | 3  |
| <b>Construction Issues</b>      | <ul style="list-style-type: none"> <li>Construction risk of tunnels.</li> <li>Highway and rail access available.</li> <li>Difficult excavation in areas where deeper cuts are proposed into rock may require blasting.</li> <li>Crosses Garlock Fault in deep tunnel.</li> </ul>   | <ul style="list-style-type: none"> <li>Construction risk of multiple tunnels.</li> <li>Highway access available.</li> <li>Difficult excavation in areas where deeper cuts are proposed into rock may require blasting.</li> <li>Crosses Garlock Fault in deep tunnel.</li> </ul>   | <ul style="list-style-type: none"> <li>Construction risk of tunnels.</li> <li>Design/construction implications of seismic zone.</li> <li>Generally excavatable soils with deeper cuts in some areas requiring heavy ripping or blasting.</li> <li>Crosses Garlock Fault in deep tunnel.</li> </ul>   | <ul style="list-style-type: none"> <li>Design/construction implications of seismic zone.</li> <li>Generally excavatable soils with deeper cuts in some areas requiring heavy ripping or blasting.</li> <li>Crosses Garlock Fault in deep tunnel.</li> </ul>  |
|                                 | 1  | 1  | 1  | 1  |
| <b>Capital Cost</b>             | \$6.9 Billion VHS<br>\$8.2 Billion Maglev  | \$7.0 Billion VHS<br>\$8.3 Billion Maglev  | \$7.0 Billion VHS<br>\$8.1 Billion Maglev  | \$7.0 Billion VHS<br>\$8.2 Billion Maglev  |
|                                 | 3  | 3  | 3  | 3  |
| <b>Right-of-Way Issues/Cost</b> | <ul style="list-style-type: none"> <li>BNSF Arvin Branch ROW.</li> <li>Power line easement from Comanche Point</li> <li>Adjacent to Angeles National Forest through Soledad Canyon.</li> <li>Short segment traverses National Forest land.</li> </ul>  | <ul style="list-style-type: none"> <li>BNSF Arvin Branch ROW.</li> <li>Power line easement from Comanche Point.</li> <li>Generally follows existing transportation corridors, including State highways.</li> <li>Requires some property acquisition along SR-14.</li> </ul>  | <ul style="list-style-type: none"> <li>BNSF Arvin Branch ROW.</li> <li>Power line easement from Comanche Point.</li> <li>CA DWR land.</li> <li>Impacts development in Palmdale east of SR-14.</li> <li>Adjacent to Angeles National Forest through Soledad Canyon.</li> <li>Short segment traverses National Forest land.</li> </ul>   | <ul style="list-style-type: none"> <li>BNSF Arvin Branch ROW.</li> <li>Power line easement from Comanche Point.</li> <li>Generally follows existing transportation / public corridors.</li> <li>CA DWR land.</li> <li>Impacts development in Palmdale east of SR-14.</li> <li>Requires some property acquisition along SR-14.</li> </ul>   |
|                                 | 4  | 3  | 2  | 2  |

| Evaluation Criteria  | SR-138/Soledad Canyon   | SR-138/SR-14   | Aqueduct/Soledad Canyon   | Aqueduct/SR-14  |
|--|---|--|---|---|
| <i>Maximize Compatibility with Existing and Planned Development.</i> |   |  |   |   |
| <b>Land Use Compatibility and Conflicts</b>                          | <ul style="list-style-type: none"> <li>Residential land uses approaching Bakersfield.</li> <li>Farm impacts in Central Valley.</li> <li>Oil field at toe of slope in Central Valley.</li> <li>May create indirect impacts on mixed residential/ commercial/ industrial residential land uses in the Palmdale and Lancaster areas.</li> <li>Most of Soledad Canyon portion of alignment is in a tunnel.</li> <li>Alignment adjacent to on existing concrete plant in the Santa Clara River near Soledad Canyon.</li> <li>Alignment bridges the Santa Clara River.</li> </ul> | <ul style="list-style-type: none"> <li>Residential land uses approaching Bakersfield.</li> <li>Farm impacts in Central Valley.</li> <li>Oil field at toe of slope in Central Valley.</li> <li>May create indirect impacts on mixed residential/ commercial/ industrial land uses in Palmdale.</li> <li>The alignment crosses SR-14 twice.</li> <li>A portion of the alignment parallels/crosses SR-14 and affects adjacent rural estate uses in the Acton area.</li> <li>Conflicts with proposed commercial land use in the Santa Clarita/LA County area.</li> </ul> | <ul style="list-style-type: none"> <li>Residential land uses approaching Bakersfield.</li> <li>Farm impacts in Central Valley.</li> <li>Oil field at toe of slope in Central Valley.</li> <li>May create indirect impacts on the existing residential/ commercial/ industrial land uses in Palmdale.</li> <li>May create indirect impacts on residential/ large ranches in Palmdale area.</li> <li>Crosses the California aqueduct at two places.</li> <li>Most of Soledad Canyon portion of alignment is in a tunnel.</li> <li>Alignment adjacent to on existing concrete plant in the Santa Clara River near Soledad Canyon.</li> </ul> | <ul style="list-style-type: none"> <li>Residential land uses approaching Bakersfield.</li> <li>Farm impacts in Central Valley.</li> <li>Oil field at toe of slope in Central Valley.</li> <li>May create indirect impacts on a mix of residential/ small ranches in Palmdale area.</li> <li>Crosses the California aqueduct at two places.</li> <li>A portion of the alignment parallels/crosses SR-14 and affects adjacent rural estate uses in the Acton area.</li> <li>Conflicts with proposed commercial land use in the Santa Clarita/LA County area.</li> </ul> |
|  | 4   | 4  | 3   | 3   |



| Evaluation Criteria           | SR-138/Soledad Canyon   | SR-138/SR-14  | Aqueduct/Soledad Canyon   | Aqueduct/SR-14   |
|-------------------------------|---|---|---|--|
| <b>Visual Quality Impacts</b> | <ul style="list-style-type: none"> <li>On structure approaching Bakersfield station.</li> <li>At grade through farmlands south of Bakersfield.</li> <li>Visible from residential areas south of Bakersfield.</li> <li>At grade through agriculture land along SR-138. 6 to 10 residences widely scattered w/in 200 ft. of alignment.</li> <li>Bridge from SR-138 to UPRR is 2.25 mi. long and will be visible for a long distance in the flat, rural landscape. Few residences w/ large lots to east. Mobile home park 0.25 mi. west of bridge. Residences along length of 0.5 mi. will see bridge.</li> <li>Lancaster, bridge for 5 mi. Mostly commercial area (w/in 100 ft.). May be some first tier residences on east.</li> <li>Palmdale, at grade through mostly commercial area (w/in 100 ft.) for length of 1.5 mi. May be a few first tier residences.</li> <li>Palmdale, bridge w/in 500 ft. of residential development for length of 1,000 ft.</li> <li>Tunnel through Soledad Canyon. No impacts.</li> </ul> | <ul style="list-style-type: none"> <li>On structure approaching Bakersfield station.</li> <li>At grade through farmlands south of Bakersfield.</li> <li>Visible from residential areas south of Bakersfield.</li> <li>At grade through agricultural land along SR-138. 6 to 10 residences widely scattered w/in 200 ft. of alignment.</li> <li>Bridge from SR-138 to UPRR is 2.25 mi. long and will be visible for a long distance in the flat, rural landscape. Few residences w/ large lots to east. Mobile home park 0.25 mi. west of bridge. Residences along a length of 0.5 mi. will see bridge.</li> <li>Lancaster, bridge for 5 miles. Mostly commercial area (w/in 100 ft.). May be some first tier residences on east.</li> <li>Palmdale, at grade through mostly commercial area (w/in 100 ft.) for a length of 1.5 mi. May be a few first tier residences.</li> <li>Palmdale, bridge w/in 500 ft. of residential development for length of 1,000 ft.</li> <li>Bridge at Vasquez Park extends for 0.75 mi. adjacent to south edge of park. Negative for park viewers, positive for passengers.</li> <li>Bridge at Santiago Road, may be some residences w/in 200 to 300 ft.</li> <li>Bridge east of Crown Valley Rd. w/in 1,000 ft. of Vasquez High School (first tier) and slightly further from a junior high school.</li> </ul> | <ul style="list-style-type: none"> <li>On structure approaching Bakersfield station.</li> <li>At grade through farmlands south of Bakersfield.</li> <li>Visible from residential areas south of Bakersfield.</li> <li>Bridge 9.5 mi. long, less than 200 ft. from residences in Lancaster, Palmdale and L.A. County for 5 mi. length. Large lots, rural residential area.</li> <li>Same bridge w/in 500 ft of Paraclete High School (first tier).</li> <li>At grade w/ some cut and fill along aqueduct. Excellent view for high-speed rail passengers.</li> <li>At grade w/in 800 ft. of SW corner of Antelope Valley Poppy Reserve. Alignment will be visible at greater distances along 0.25 mi. of the park.</li> <li>Palmdale, at grade through mostly commercial area (w/in 100 ft.) for length of 1.5 mi. May be a few first tier residences.</li> <li>Palmdale, bridge w/in 500 ft. of residential development for length of 1,000 ft.</li> <li>Tunnel through Soledad Canyon. No impacts.</li> </ul> | <ul style="list-style-type: none"> <li>On structure approaching Bakersfield station.</li> <li>At grade through farmlands south of Bakersfield.</li> <li>Visible from residential areas south of Bakersfield.</li> <li>Bridge 9.5 mi. long, less than 200 ft. from residences in Lancaster, Palmdale and L.A. County for 5 mi. length. Large lots, rural residential area.</li> <li>Same bridge w/in 500 ft. of Paraclete High School (first tier).</li> <li>At grade w/ some cut and fill along aqueduct. Excellent view for high-speed rail passengers.</li> <li>At grade w/in 800 ft. of SW corner of Antelope Valley Poppy Reserve. Alignment will be visible at greater distances along 0.25 mi. of the park.</li> <li>Palmdale, at grade through mostly commercial area (w/in 100 ft.) for a length of 1.5 mi. May be a few first tier residences.</li> <li>Palmdale, bridge w/in 500 ft. of residential development for length of 1,000 ft.</li> <li>Bridge at Vasquez Park extends for 0.75 mi. at south edge of park. Negative for park users, positive for passengers.</li> <li>Bridge at Santiago Road, may be some residences w/in 200 to 300 ft.</li> <li>Bridge east of Crown Valley Rd. w/in 1,000 ft. of Vasquez High School and slightly further from a junior high school.</li> </ul> |

| Evaluation Criteria   | SR-138/Soledad Canyon  | SR-138/SR-14   | Aqueduct/Soledad Canyon  | Aqueduct/SR-14   |
|---|--|--|--|--|
|   | 3  | 3  | 1  | 1  |
| <i>Minimize Impacts on Natural Resources.</i>   |  |  |  |  |
| <b>Water Resources</b><br>Number and sensitivity level of waters and potential wetland/riparian resources crossed by alignment.<br>Sensitivity of surface waters proximate (< 1 mile) to tunnel segments. | <ul style="list-style-type: none"> <li>At-grade crossings: 11 low, 7 low/mod, 4 mod/high.</li> <li>Tunnel overcrossings: 34 low, 11 low/mod, 3 mod/high.</li> <li>Proximate to tunneled segment: 7 low, 9 low/mod, 1 mod/high 1 high.</li> </ul>   | <ul style="list-style-type: none"> <li>At-grade crossings: 12 low, 10 low/mod, 3 mod/high (+ 1 mod/high bridged).</li> <li>Tunnel overcrossings: 25 low, 3 low/mod.</li> <li>Proximate to tunneled segment: 9 low, 12 low/mod.</li> </ul>  | <ul style="list-style-type: none"> <li>At-grade crossings: 25 low, 10 low/mod, 4 mod/high.</li> <li>Tunnel overcrossings: 36 low, 10 low/mod.</li> <li>Proximate to tunneled segment: 7 low, 9 low/mod, 1 mod/high, 1 high.</li> </ul>   | <ul style="list-style-type: none"> <li>At-grade crossings: 25 low, 10 low/mod, 3 mod/high (+ 1 mod/high bridged).</li> <li>Tunnel overcrossings: 25 low, 2 low/mod.</li> <li>Proximate to tunneled segments: 8 low, 10 low/mod.</li> </ul>   |
|   | 2  | 4  | 3  | 5  |
| <b>Floodplain Impacts</b>   | <ul style="list-style-type: none"> <li>Crosses major floodplains south of Bakersfield.</li> <li>100 and 500 year floodplains along east-west segment of SR-138 and on south side of the Tehachapis.</li> <li>Extensive 100-year floodpains just north of Lancaster.</li> <li>500-year floodplains in Palmdale and Lancaster.</li> <li>Crosses Santa Clara River floodplain.</li> </ul> | <ul style="list-style-type: none"> <li>Crosses major floodplains south of Bakersfield.</li> <li>100 and 500 year floodplains along east-west segment of SR-138 and on south side of the Tehachapis.</li> <li>Extensive 100-year floodpains just north of Lancaster.</li> <li>500-year floodplains in Palmdale and Lancaster.</li> <li>Crosses Santa Clara River floodplain.</li> </ul> | <ul style="list-style-type: none"> <li>Crosses major floodplains south of Bakersfield.</li> <li>100-year floodplain on south side of Tehachapis.</li> <li>100-year floodplain east of SR-14 and west of UPRR.</li> <li>500-year floodplains in Palmdale.</li> <li>Crosses Santa Clara River floodplain.</li> </ul> | <ul style="list-style-type: none"> <li>Crosses major floodplains south of Bakersfield.</li> <li>100-year floodplain on south side of Tehachapis.</li> <li>100-year floodplain east of SR-14 and west of UPRR.</li> <li>500-year floodplains in Palmdale.</li> <li>Crosses Santa Clara River floodplain.</li> </ul> |
|   | 3  | 3  | 3  | 3  |
| <b>Threatened &amp; Endangered Species Impacts</b>  | <ul style="list-style-type: none"> <li>Traverses large agricultural areas. Mountainous areas tunneled.</li> <li>Lower potential to impact sensitive species.</li> </ul>  | <ul style="list-style-type: none"> <li>Traverses large agricultural areas.</li> <li>Mountainous area tunneled.</li> <li>Lower potential to impact sensitive species.</li> </ul>  | <ul style="list-style-type: none"> <li>Traverses through several types of native habitat. Higher potential to impact range of sensitive species.</li> </ul>  | <ul style="list-style-type: none"> <li>Traverses through several types of native habitat. Higher potential to impact range of sensitive species.</li> </ul>  |
|   | 5  | 5  | 4  | 4  |

| Evaluation Criteria   | SR-138/Soledad Canyon  | SR-138/SR-14   | Aqueduct/Soledad Canyon   | Aqueduct/SR-14   |
|---|--|--|---|--|
| <i>Minimize Impacts on Social and Economic Resources.</i>     |  |  |   |  |
| <b>Environmental Justice Impacts</b><br><b>(Demographics)</b> | Central Valley:<br>1990 Minority population: 22,595<br>1990 In-poverty households: 262<br><br>Tehachapis, south:<br>1990 Minority population: 3,943<br>1990 In-poverty households: 947<br><br>Total:<br>1990 Minority population: 26,538<br>1990 In-poverty households: 1,209  | Central Valley:<br>1990 Minority population: 22,595<br>1990 In-poverty households: 262<br><br>Tehachapis, south:<br>1990 Minority population: 3,936<br>1990 In-poverty households: 947<br><br>Total:<br>1990 Minority population: 26,537<br>1990 In-poverty households: 1,209  | Central Valley:<br>1990 Minority population: 22,595<br>1990 In-poverty households: 262<br><br>Tehachapis, south:<br>1990 Minority population: 2,871<br>1990 In-poverty households: 563<br><br>Total:<br>1990 Minority population: 25,466<br>1990 In-poverty households: 825   | Central Valley:<br>1990 Minority population: 22,595<br>1990 In-poverty households: 262<br><br>Tehachapis, south:<br>1990 Minority population: 2,864<br>1990 In-poverty households: 563<br><br>Total:<br>1990 Minority population: 25,459<br>1990 In-poverty households: 825  |
|   | 4  | 4  | 4   | 4  |
| <b>Farmland Impacts</b>                                       | <ul style="list-style-type: none"> <li>Alignment would impact existing farmlands south of Bakersfield before reaching the Tehachapi Mountains.</li> <li>Crosses areas with soils that could be farmed in the Central Valley, the Lancaster and Palmdale areas, and in Soledad Canyon.</li> <li>Crosses grazing areas.</li> </ul> | <ul style="list-style-type: none"> <li>Alignment would impact existing farmlands south of Bakersfield before reaching the Tehachapi Mountains.</li> <li>Crosses areas with soils that could be farmed in the Central Valley, and in the Lancaster and Palmdale areas.</li> <li>The SR-14 portion of this alignment would not traverse through any areas currently being commercially farmed.</li> <li>The SR-14 and SR-138 portions of this alignment would traverse a few areas with soils that could be farmed.</li> <li>Crosses grazing areas.</li> </ul> | <ul style="list-style-type: none"> <li>Alignment would impact existing farmlands south of Bakersfield before reaching the Tehachapi Mountains.</li> <li>Crosses areas with soils that could be farmed in the Central Valley, and in the Lancaster and Palmdale areas.</li> <li>The Soledad Canyon and Aqueduct portions of the alignment would traverse areas with soils that could be farmed.</li> <li>Crosses grazing areas.</li> </ul> | <ul style="list-style-type: none"> <li>Alignment would impact existing farmlands south of Bakersfield before reaching the Tehachapi Mountains.</li> <li>Crosses areas with soils that could be farmed in the Central Valley, and in the Lancaster and Palmdale areas.</li> <li>The SR-14 portion of the alignment would not traverse any areas that are currently being commercially farmed.</li> <li>The Aqueduct portion of the alignment would traverse a few locations with soils that could be farmed.</li> <li>Crosses grazing areas.</li> </ul> |
|   | 4  | 3  | 3   | 3  |

| Evaluation Criteria                                   | SR-138/Soledad Canyon   | SR-138/SR-14  | Aqueduct/Soledad Canyon  | Aqueduct/SR-14  |
|---|---|---|--|---|
| <i>Minimize Impacts on Cultural Resources.</i>        |   |   |  |   |
| <b>Cultural Resources Impacts</b>                     | <ul style="list-style-type: none"> <li>Few recorded resources on GIS.</li> <li>Overall probable impact is low to moderate along SR-138; route crosses open desert.</li> <li>Potential impacts during at-grade/bridge passage through Palmdale and Lancaster, including visual impacts on historical resources.</li> <li>Overall probable impact is low in Soledad Canyon; route is mostly tunnel.</li> <li>Potential impacts at at-grade/bridge crossings of Santa Clara River and Mill Creek.</li> </ul> | <ul style="list-style-type: none"> <li>Few recorded resources on GIS.</li> <li>Overall probable impact is low to moderate along SR-138; route crosses open desert.</li> <li>Potential impacts during at-grade/bridge passage through Palmdale and Lancaster, including visual impacts on historical resources.</li> <li>Four sites recorded at Vasquez Rocks County Park.</li> <li>Overall probable impact is low along SR-14; route is mostly tunnel.</li> <li>Potential impacts at at-grade/bridge crossings of Santa Clara River, Aqua Dulce Canyon, Escondido Canyon and Acton Canyon.</li> </ul> | <ul style="list-style-type: none"> <li>Few recorded resources on GIS.</li> <li>Overall probable impact is high along Aqueduct, route crosses numerous streams at base of San Gabriel Mountains.</li> <li>Potential impacts during at-grade/bridge passage through Palmdale, including visual impacts on historical resources.</li> <li>Overall probable impact is low in Soledad Canyon; route is mostly tunnel.</li> <li>Potential impacts at at-grade/bridge crossings of Santa Clara River and Mill Creek.</li> </ul> | <ul style="list-style-type: none"> <li>Few recorded resources on GIS.</li> <li>Overall probable impact is high along Aqueduct, route crosses numerous streams at base of San Gabriel Mountains.</li> <li>Potential impacts during at-grade/bridge passage through Palmdale, including visual impacts on historical resources.</li> <li>Four sites recorded at Vasquez Rocks County Park, possible visual impacts.</li> <li>Overall probable impact is low along SR-14; route is mostly tunnel.</li> <li>Potential impacts at at-grade/bridge crossings of Santa Clara River, Aqua Dulce Canyon, Escondido Canyon and Acton Canyon.</li> </ul> |
|   | 4   | 3   | 2  | 1   |
| <b>Parks &amp; Recreation/Wildlife Refuge Impacts</b> | <ul style="list-style-type: none"> <li>No local or County public park resources located in Soledad Canyon.</li> <li>Short segment traverses National Forest Lands in Soledad Canyon.</li> <li>No park resources located along at-grade/bridge portion of SR-138 segment.</li> <li>Passes under Los Padres National Forest in tunnel.</li> </ul>   | <ul style="list-style-type: none"> <li>Passes on bridge/at-grade near Vasquez Rocks County Park; potential for visual impacts.</li> <li>No park resources located along at-grade/bridge portion of SR-138 alignment.</li> <li>Passes under Los Padres National Forest in tunnel.</li> </ul>   | <ul style="list-style-type: none"> <li>No local or County public park resources located in Soledad Canyon.</li> <li>Short segment traverses National Forest Lands in Soledad Canyon.</li> <li>Very low potential for visual impacts along Aqueduct.</li> <li>Passes on bridge near Hillside Park, at grade near Antelope Valley Poppy Preserve Park, and Joshua Tree Preserve, potential for visual impacts.</li> <li>Passes under Los Padres National Forest in tunnel.</li> </ul>                                      | <ul style="list-style-type: none"> <li>Generally low potential for visual impacts along SR-14.</li> <li>Passes on bridge/at-grade near Vasquez Rocks County Park; potential for visual impacts.</li> <li>Very low potential for visual impacts along Aqueduct.</li> <li>Passes on bridge near Hillside Park, at grade near Antelope Valley Poppy Preserve Park, and Joshua Tree Preserve, potential for visual impacts.</li> <li>Passes under Los Padres National Forest in tunnel.</li> </ul>  |
|   | 4   | 3   | 2  | 1   |

| Evaluation Criteria   | SR-138/Soledad Canyon  | SR-138/SR-14   | Aqueduct/Soledad Canyon   | Aqueduct/SR-14  |
|---|--|--|---|---|
| <i>Maximize Avoidance of Areas with Geologic and Soils Constraints.</i> |  |  |   |   |
| <b>Soils/Slope Constraints</b>  | <ul style="list-style-type: none"> <li>Medium – Formations with marginal stability including largely continental deposits and older (Paleozoic) marine sediments.</li> </ul>   | <ul style="list-style-type: none"> <li>Medium – Formations with marginal stability including largely continental deposits and older (Paleozoic) marine sediments.</li> </ul>   | <ul style="list-style-type: none"> <li>Medium – Formations with marginal stability including largely continental deposits and older (Paleozoic) marine sediments.</li> </ul>  | <ul style="list-style-type: none"> <li>Medium – Formations with marginal stability including largely continental deposits and older (Paleozoic) marine sediments.</li> </ul>  |
|   | 4  | 4  | 4   | 4   |
| <b>Seismic Constraints</b>  | <ul style="list-style-type: none"> <li>Low/Medium – Liquefaction potential.</li> <li>Medium – Active fault crossings.</li> <li>Medium/High – Probable ground motion from earthquakes.</li> <li>Crosses Garlock fault in tunnel; crosses San Andreas Fault at grade.</li> </ul> | <ul style="list-style-type: none"> <li>Low/Medium – Liquefaction potential.</li> <li>Medium – Active fault crossings.</li> <li>Medium/High – Probable ground motion from earthquakes.</li> <li>Crosses Garlock fault in tunnel; crosses San Andreas Fault at grade.</li> </ul> | <ul style="list-style-type: none"> <li>Medium/High – Liquefaction potential.</li> <li>Low - Active fault crossings.</li> <li>Low – Probable ground motion from earthquakes.</li> <li>Crosses Garlock Fault in tunnel.</li> <li>Follows San Andreas Fault Zone for nearly 30 mi. (50 km).</li> </ul> | <ul style="list-style-type: none"> <li>Medium/High – Liquefaction potential.</li> <li>Low - Active fault crossings.</li> <li>Low – Probable ground motion from earthquakes.</li> <li>Crosses Garlock Fault in tunnel.</li> <li>Follows San Andreas Fault Zone for nearly 30 mi. (50 km).</li> </ul> |
|   | 1  | 1  | 1   | 1   |
| <i>Maximize Avoidance of Areas with Potential Hazardous Materials.</i>  |  |  |   |   |
| <b>Hazardous Materials/Waste Constraints</b>                            | <ul style="list-style-type: none"> <li>There are approximately 3 CERCLIS, SPL, or SCL sites near this alignment.</li> <li>This alignment is near a Super Fund site adjacent to a concrete plant in the Santa Clarita River near the City of Santa Clarita.</li> </ul>          | <ul style="list-style-type: none"> <li>There are approximately 3 CERCLIS, SPL, or SCL sites near this alignment.</li> </ul>  | <ul style="list-style-type: none"> <li>This alignment is near a Super Fund site adjacent to a concrete plant in the Santa Clarita River near the City of Santa Clarita.</li> <li>There are approximately 4 CERCLIS, SPL, or SCL sites near this alignment.</li> </ul>                               | <ul style="list-style-type: none"> <li>There are approximately 4 CERCLIS, SPL, or SCL sites near this alignment.</li> </ul>   |
|   | 2  | 4  | 2   | 4   |

1 2 3 4 5  
Least Favorable Most Favorable